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The Victorian Newborn Resuscitation Project

Operating & troubleshooting a self inflating bag

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Six key steps to success

Step 1

- Choose the correct size self inflating bag for newborn resuscitation: a 240 mL bag

Step 2

- Choose the correct sized mask according to the size of the newborn infant

Step 3

- Assemble the bag and mask, ensuring that all the valves are present and inserted correctly

Six key steps to success

Step 4

- Test the functionality of the bag and mask

Step 5

- Create a good seal between the infant's face and the mask using the "two point top hold"

Step 6

- Continually reassess your ventilation technique to ensure ventilation is effective

Step 1

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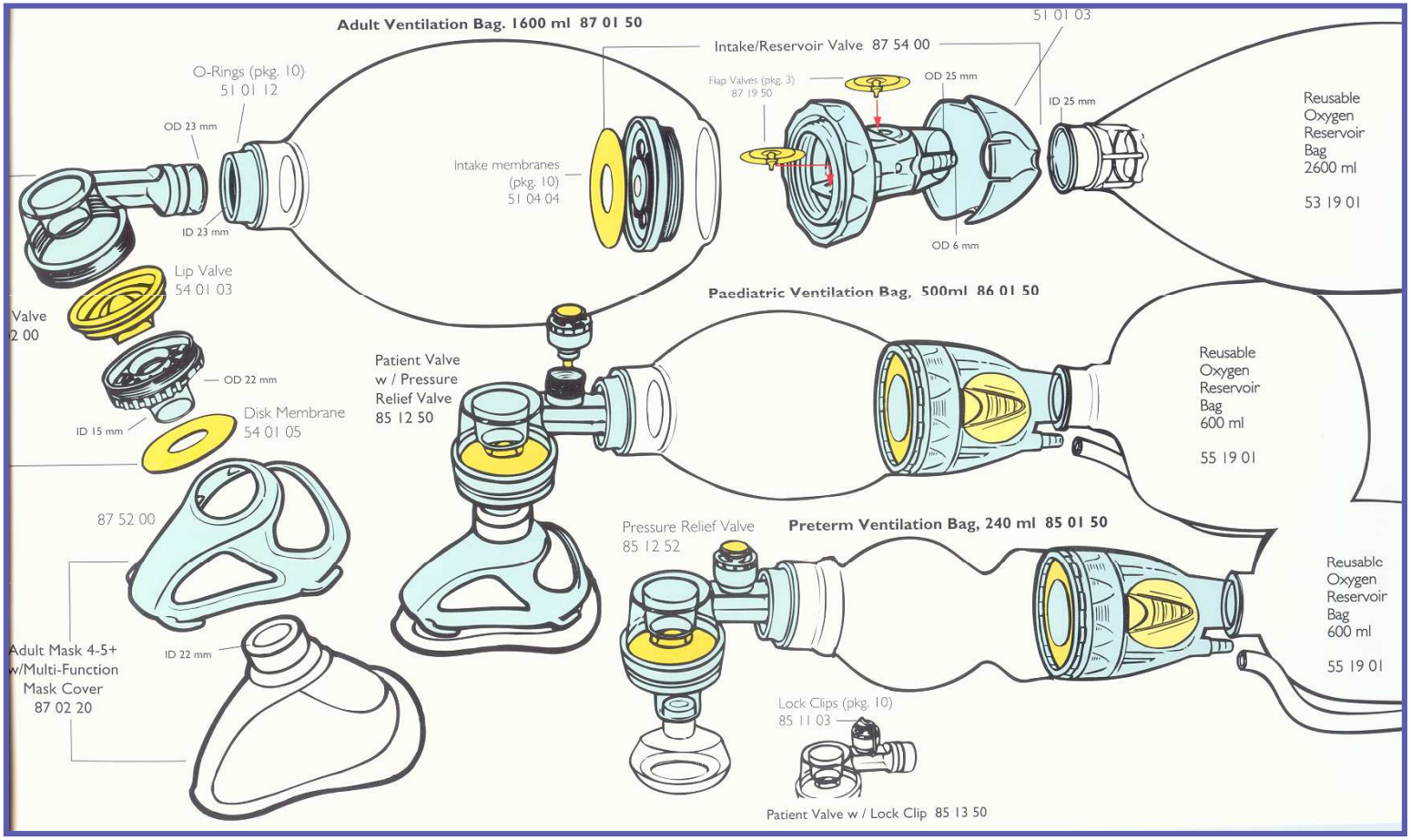
Choose the correct size bag

- The 240 mL self inflating bag, is the most appropriate size for all newborn infants. Why?

- The tidal volume required by a newborn infant is approximately 4 – 6 mL/kg body weight, therefore a volume of 240 mL should be more than adequate to inflate any newborn's lungs

(Australian Resuscitation Council, 2006, Guideline 13.4)

Comparison of Laerdal™ adult, paediatric & ‘preterm’ bags



Step 2

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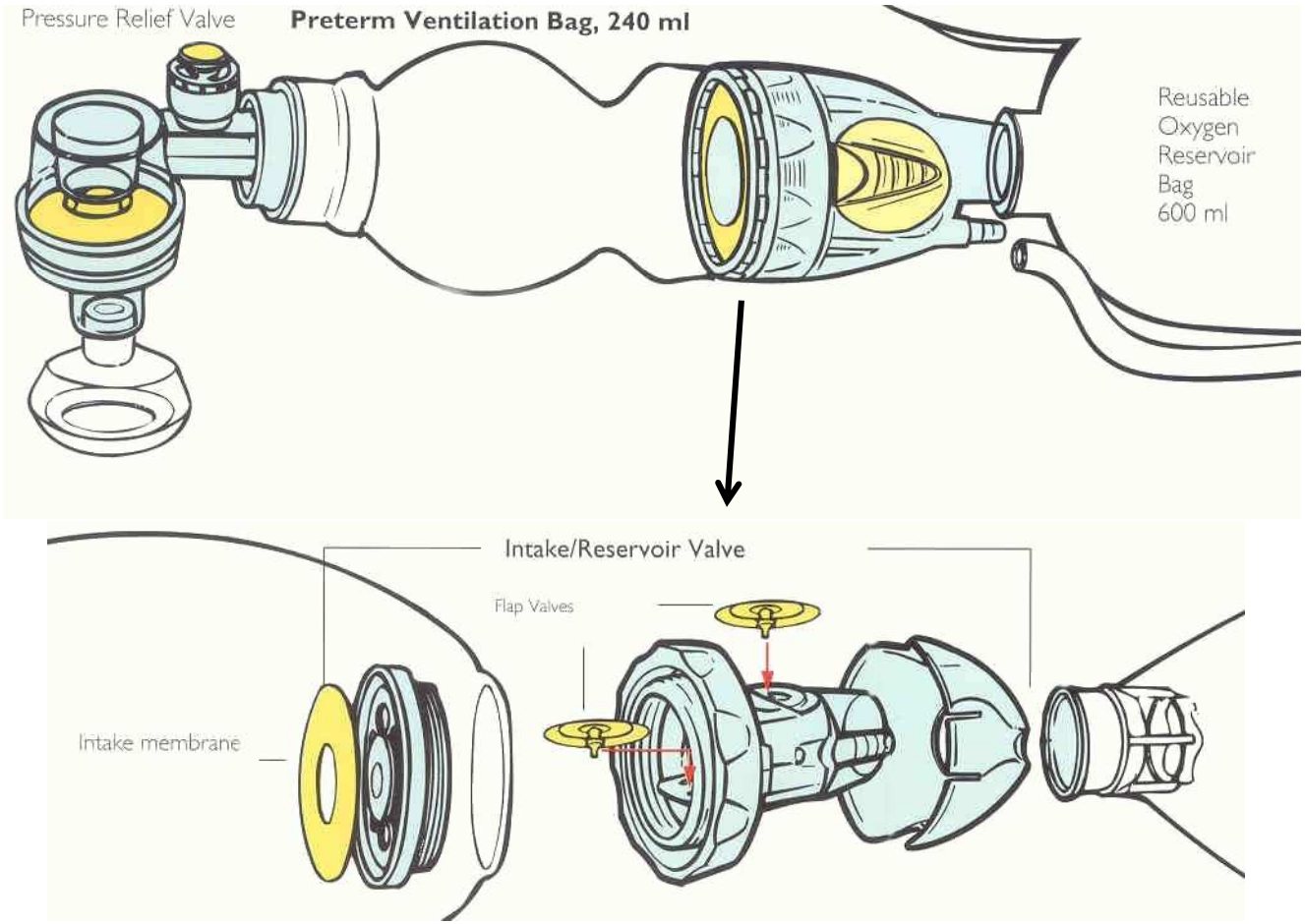
Choose the correct size mask

- The rim of the mask should cover the tip of the chin, the mouth & the nose but not the eyes. It should not extend under the chin
- If the mask is too big, a good seal cannot be achieved and effective ventilation will be impossible

Step 3

Assemble the Laerdal™ 240 mL ‘preterm’ ventilation bag



Step 4

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Test the bag before use

- Place the mask firmly against your hand
- Squeeze the bag repeatedly
- You should feel air pressure against your hand and see the lip valve open and close

If pressure is not felt, this device is not safe to use!

Check that the lip valve opens & closes with each squeeze of the bag

Disposable (single use) bags are tested the same way

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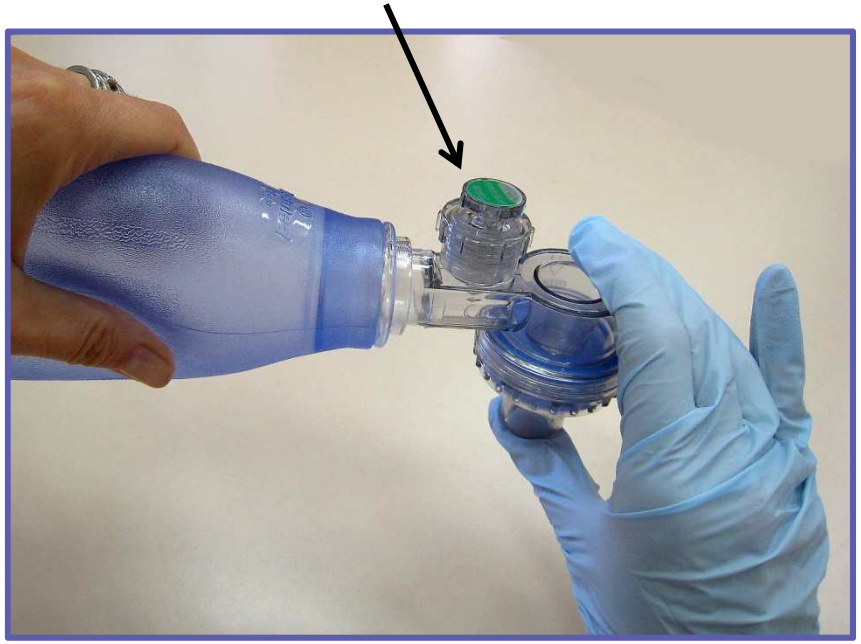
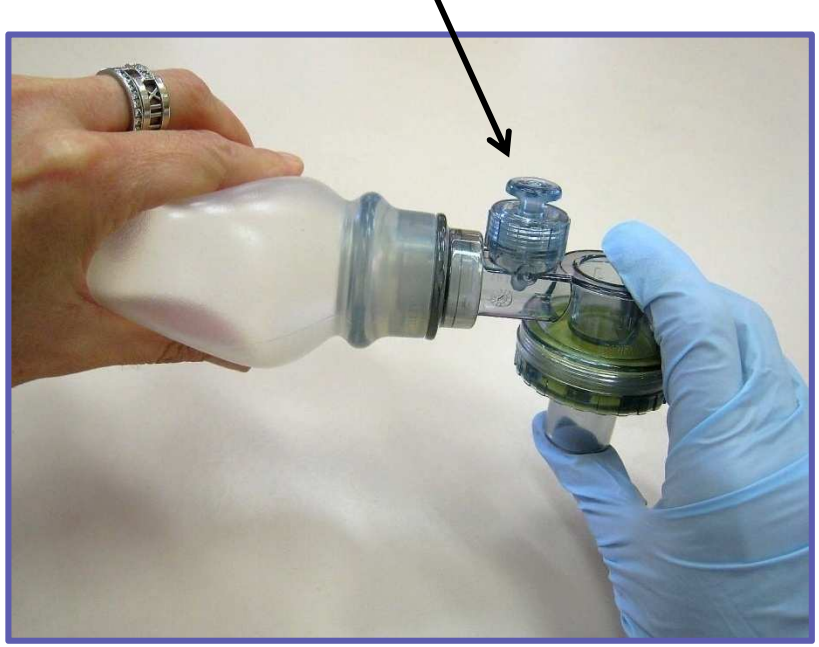
Test the pressure relief valve

- Remove the mask and occlude the patient port connector with your thumb
- Compress the bag several times
- Look & listen for opening of the pressure relief valve





The pressure relief valve: (The “pop off” valve)

- The maximum pressure is limited to a factory setting which varies from 35 – 45 cmH_20 according to the manufacturer of the bag
- A higher peak pressure (PIP) can be given by occluding the pressure relief valve whilst squeezing the bag
- Be aware that pressure relief valves have been shown to activate at a wide range of pressures and well in excess of the factory setting of 35 – 45 cmH_20 (Ganga-Zandzou, et al., 1996)
- Unless you are using an in-line pressure manometer, you will not know how much peak pressure you are delivering with each inflation

Connect an oxygen source & check that the reservoir bag inflates

- At a flow rate of ≥ 5 L/min, 97 - 100% oxygen is delivered *with or without* the reservoir bag attached to the Laerdal bag
- Removing the reservoir bag does not significantly reduce the oxygen concentration (Thio, et al., 2009)

Step 5

Create a good seal between the infant's face & the mask

- Position the infant's head in a neutral position
- Place a finger onto the chin tip (the "guide finger")
- Line up the outer edge of the mask into the groove between the guide finger and the chin tip
- Roll the mask onto the face from the chin upwards

Holding the mask in place using the “two point top hold”

- Apply evenly balanced downward pressure onto the mask using the thumb and index finger positioned toward the outer edge of the flat area of the mask (“two point top hold”)
- Apply jaw lift with the remaining fingers so that the upward pressure works against the downward pressure from the two point top hold to create a good seal

The two point top hold

Wood, et al. (2008).
***Archives of Disease in Childhood, Fetal & Neonatal Edition, 93*: p. F231**

Incorrect ways to hold a mask

A: Do not hold the stem

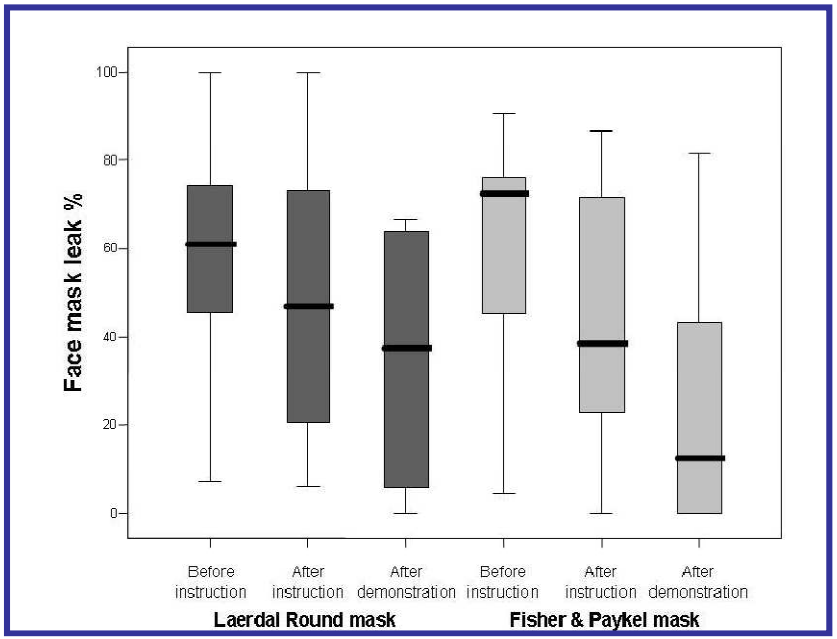
B: Do not hold the outer edge

Holding the mask by the stem (A) or by the outer edge of the rim (B) will result in a poor seal & significant mask leak

Leak around face masks

- Leaks averaging 40% to 70% around face masks are common due to poor mask placement technique

- It cannot be assumed that just because the mask is on the face that there is a good seal



Reference: Wood, et al. (2008). *Archives of Disease in Childhood: Fetal & Neonatal Edition, 93:* p. F231.

Air or oxygen for resuscitation?

- Air (21%) should be used initially
- Oxygen should be introduced if the newborn does not improve during the first minutes of life
- Hyperoxia should be avoided, especially in the preterm infant
- Slowly wean the FiO_2 once pre-ductal $SpO_2 > 90\%$

Step 6

Is your technique effective?

- If your ventilation technique is effective, three signs are observed:
  - The heart rate increases to above 100 bpm
  - The chest & upper abdomen rise with each inflation
  - The newly born infant should begin to look pink
- If these signs are not seen, the technique of ventilation needs to be improved
- Intubation should also be considered

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Disclaimer

This teaching program has been developed by the Newborn Emergency Transport Service (NETS) part of The Royal Women's Hospital (RWH) as an educational program around neonatal care with the assistance of a grant from the Department of Health Victoria.

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